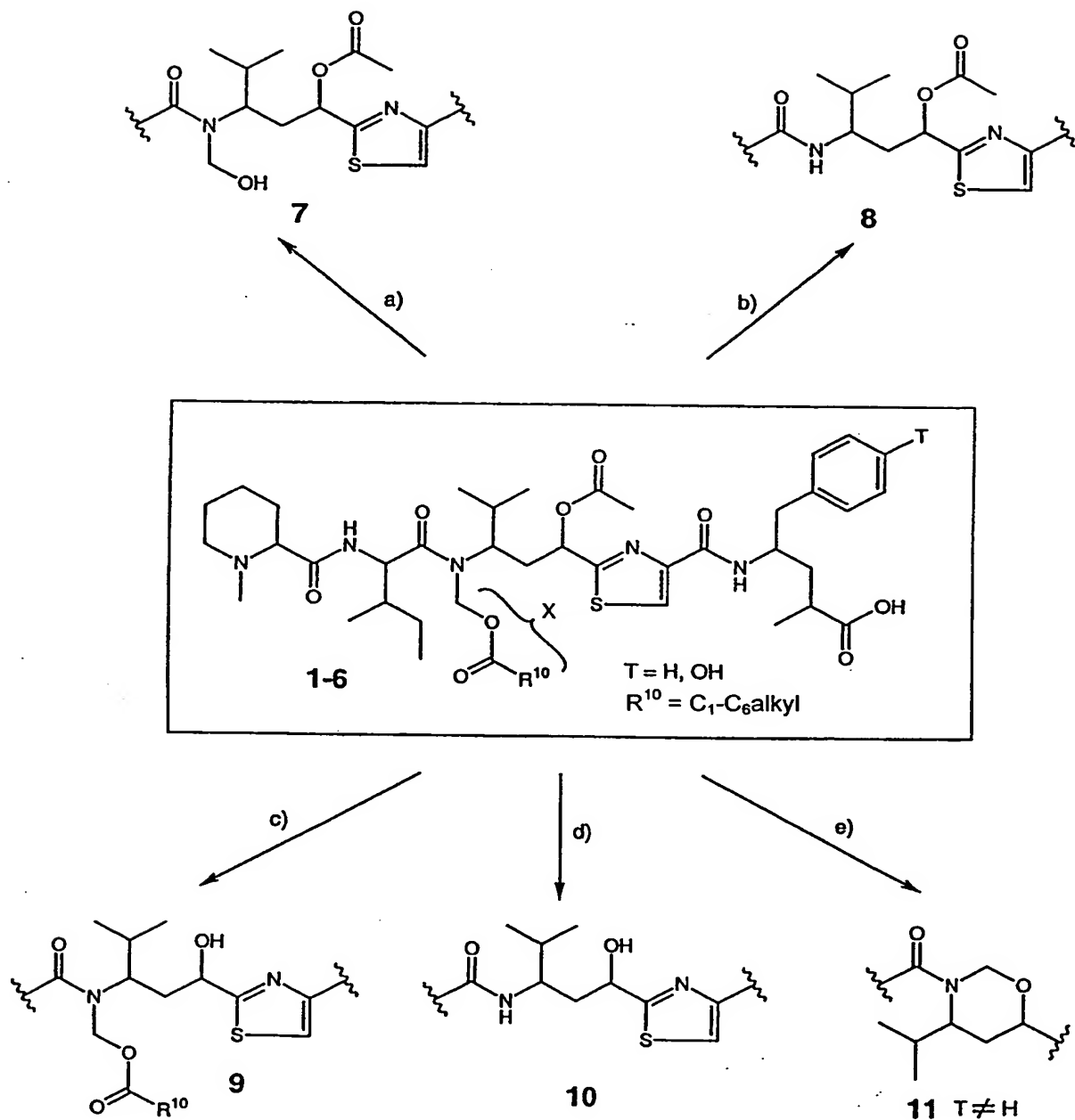
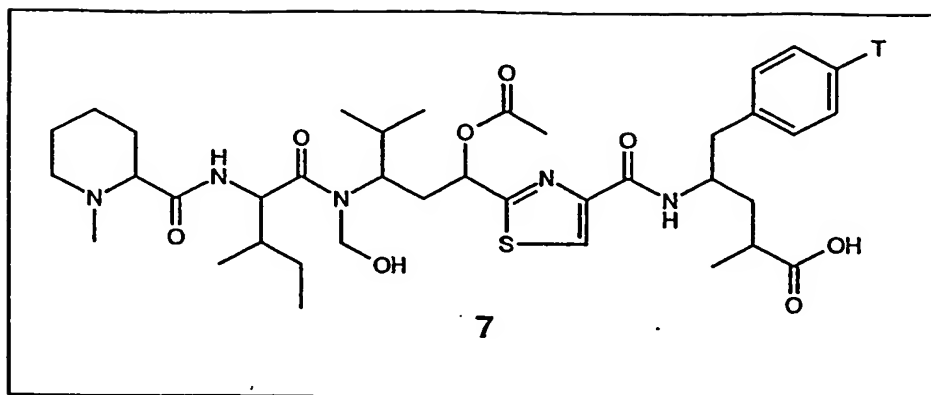


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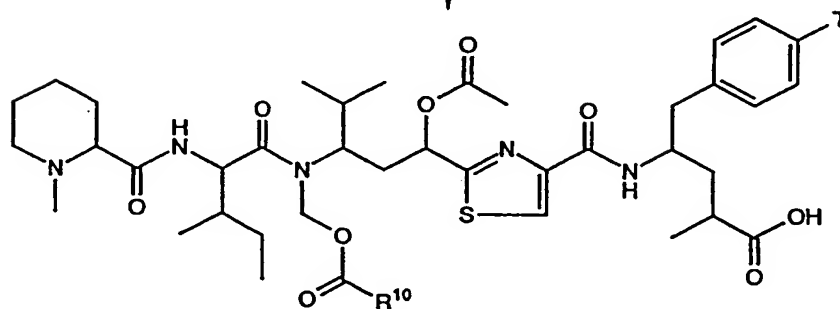


a) 0.1 M HCl, dioxane, 50°C; b) 0.1 M HCl, 100°C; c) NH_3 , MeOH; d) 1 M NaOH, MeOH; e) 0.5 M HCl, 100°C

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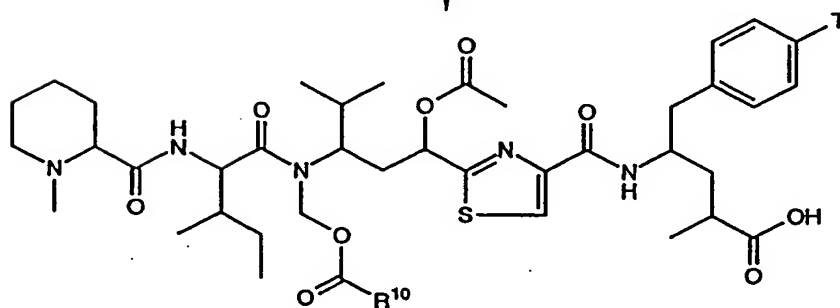


a)



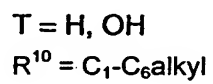
12 T = H, OCOR⁵
 R¹⁰ = C₁-C₆alkyl, C₁-C₆alkenyl, aryl, heteroaryl

b)



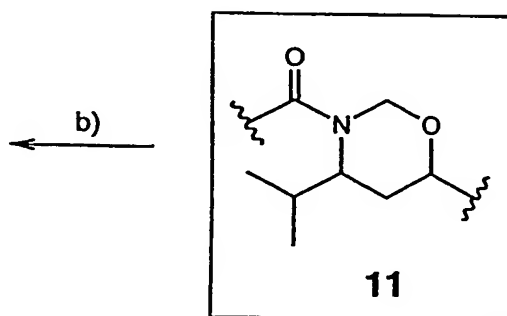
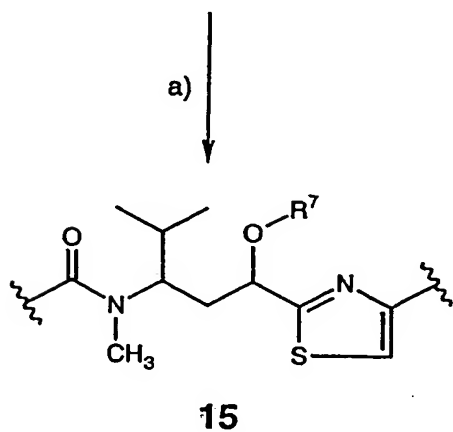
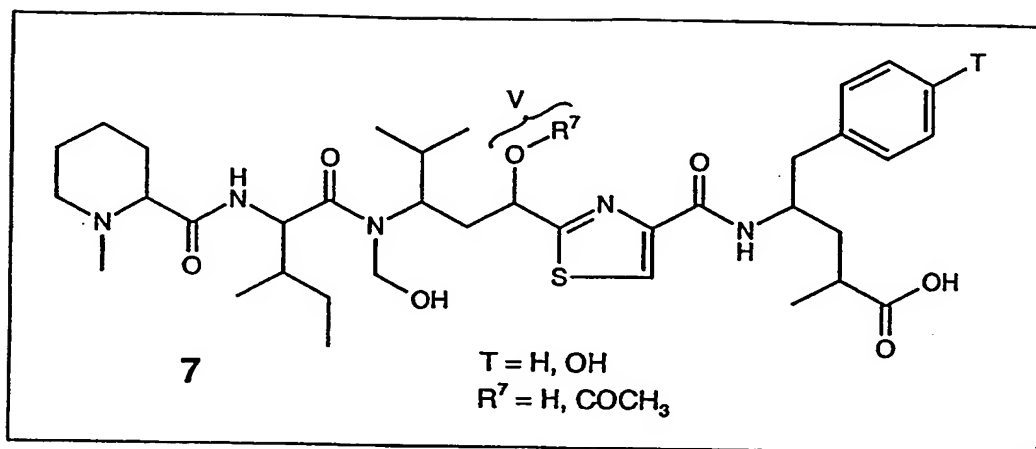
13 T = H, OH
 R¹⁰ = C₁-C₆alkyl, C₁-C₆alkenyl, aryl, heteroaryl

a) R¹⁰COCl, Et₃N; b) NH₃



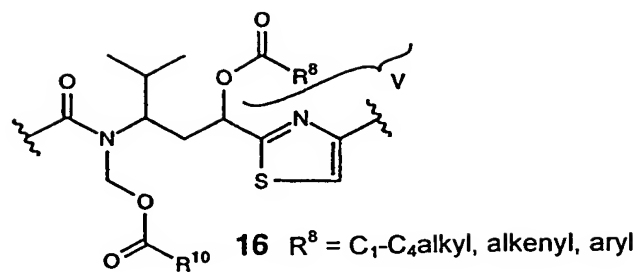
a) $p\text{-CH}_3\text{-C}_6\text{H}_4\text{SO}_2\text{OH}$, R^9OH , THF, 80°C

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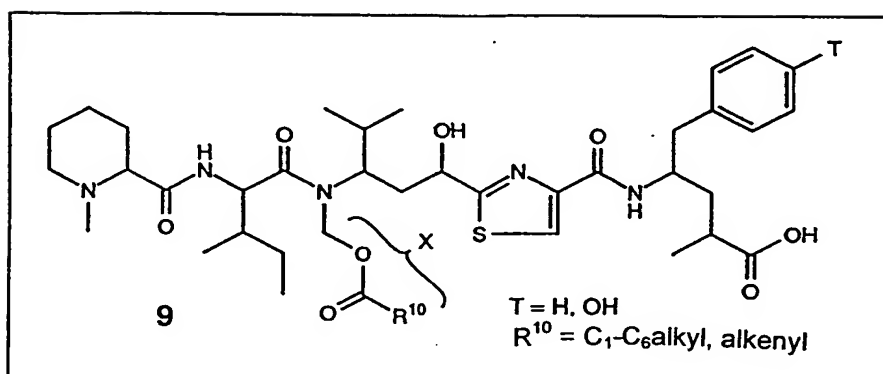


a) $NaCNBH_3$, TFA, MeOH; b) $NaCNBH_3$, Me_3SiCl , CH_3CN

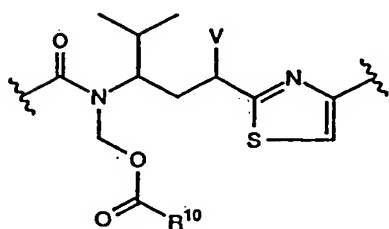
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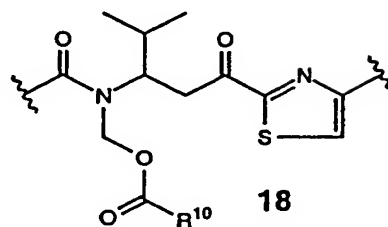
a)



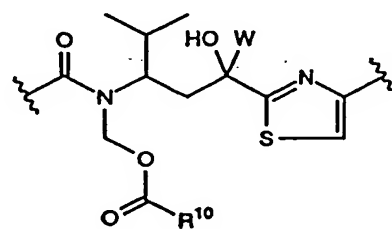
b)



c)

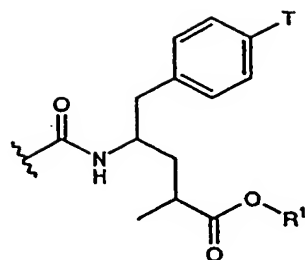
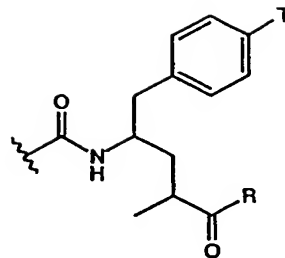


d)

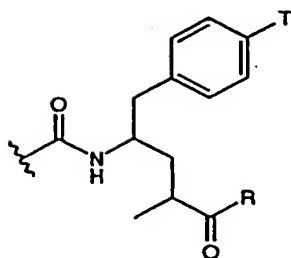
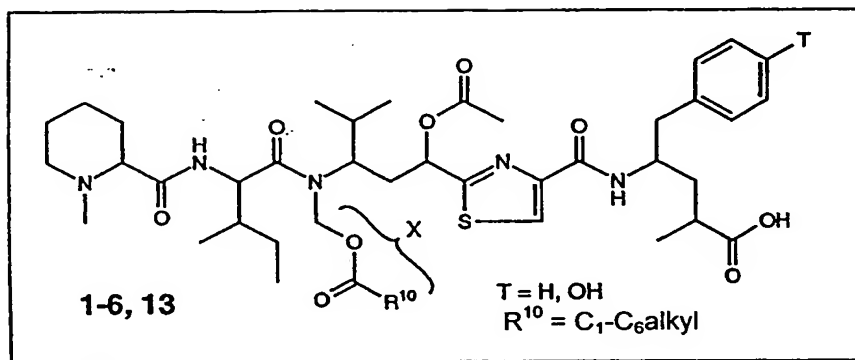
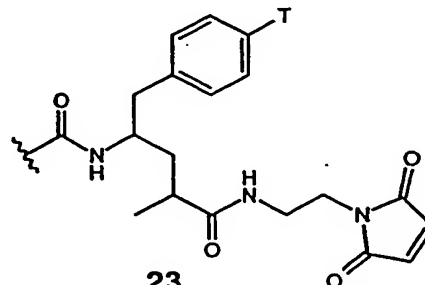


a) $R^8\text{COCl, Et}_3\text{N}$, b) $\text{Pd/C, H}_2, \text{CH}_3\text{COOH}$ or DAST;
c) TPAP, NMO; d) WMgHal

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20 $R^1 = C_1-C_4\text{alkyl, alkenyl}$ 

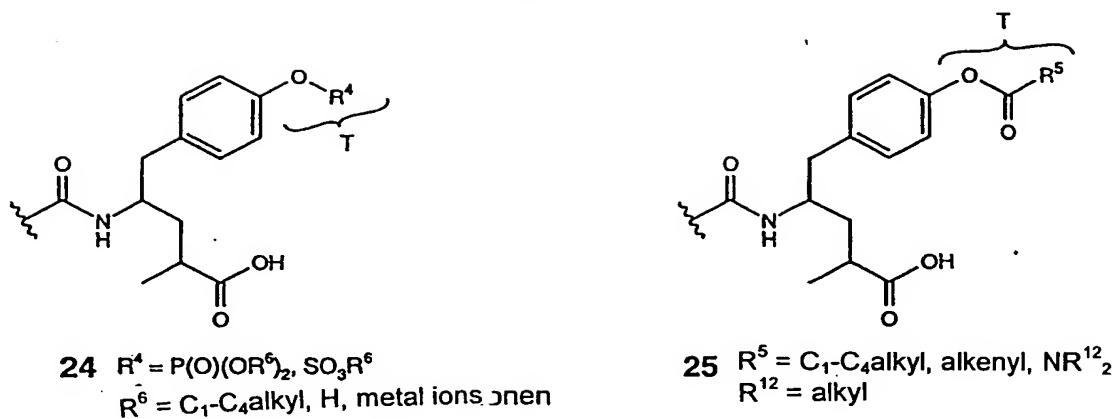
21 $R = \text{NHR}^1, \text{NH-NR}^1\text{R}^2, \text{NHOR}^1, \text{NH}(\text{CH}_2)_{2-4}\text{NR}^1\text{R}^2$
 $R^1 = \text{H, C}_1\text{-C}_6\text{alkyl, aryl}$
 $R^2 = \text{H, C}_1\text{-C}_6\text{alkyl, aryl}$

22 $R = C_1-C_4\text{alkyl, alkenyl}$ 

23

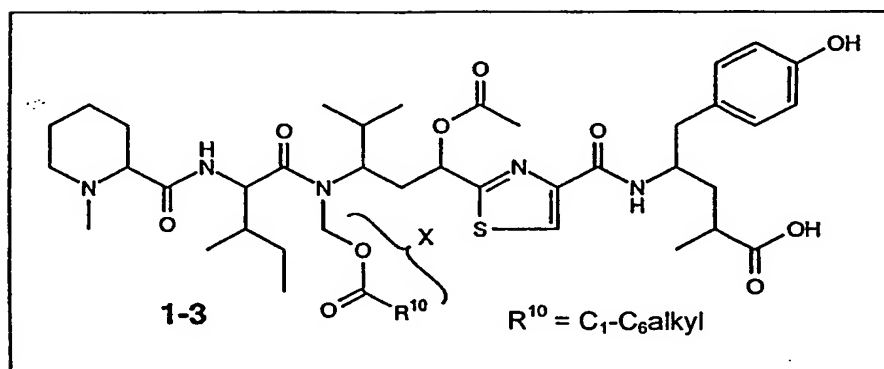
a) EDC, $R^1\text{OH}$, DMAP, CH_2Cl_2 ; b) EDC, RH , CH_2Cl_2 or isobutyl chloroformate, Et_3N , RH , abs. THF
 c) RLi; d) EDC, 1-(2-aminoethyl)-pyrrole-2,5-dione, CH_2Cl_2

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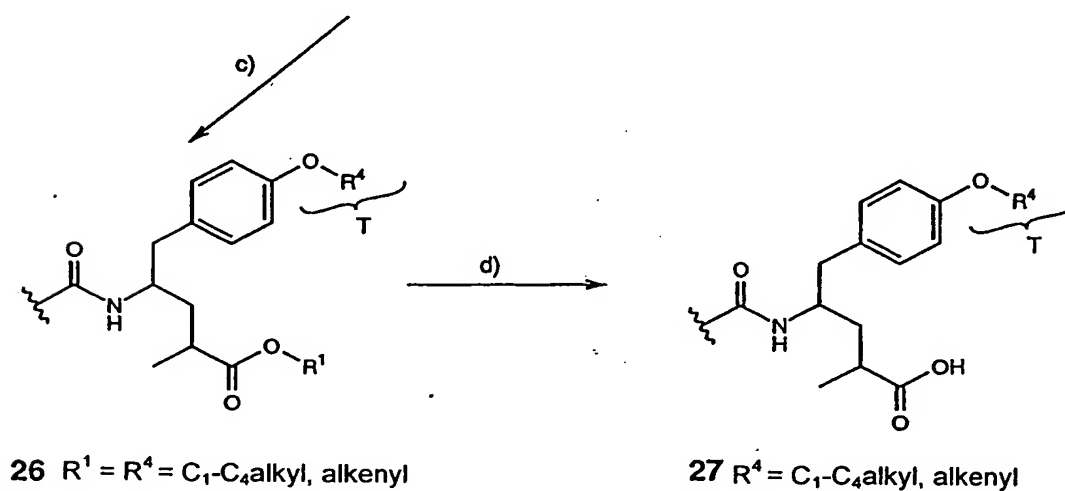
a)

b)



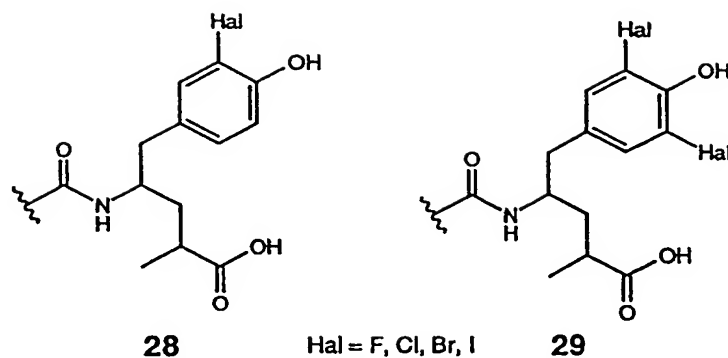
c)

d)

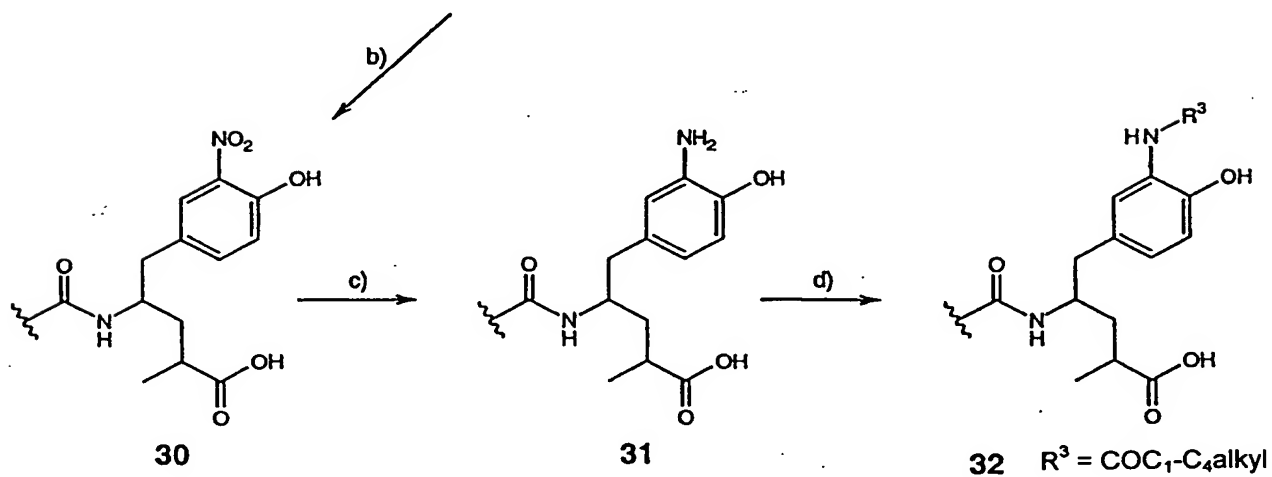
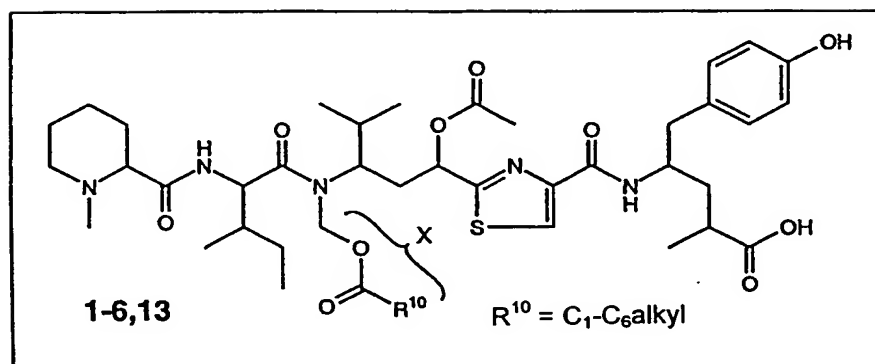


a) $P(O)(OR^6)_2OH, I_2, \text{pyridine}, CH_2Cl_2$ or $\text{pyridine}-SO_3$; b) $R^5COCl, Et_3N, \text{abs. THF}$;
 c) Ag_2O, R^4I, CH_2Cl_2 ; for $R^4 = CH_3, CH_2N_2, MeOH$; d) pig liver esterase, KH_2PO_4 buffer, $36^\circ C$;

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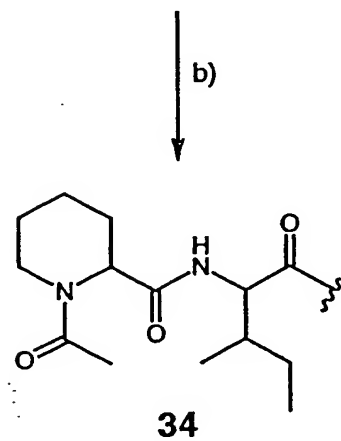
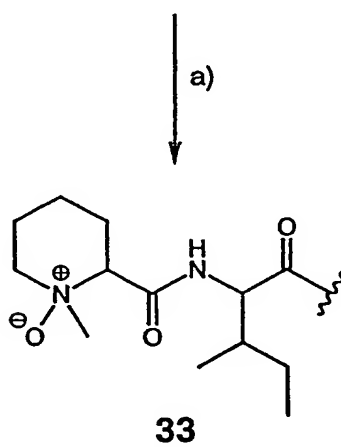
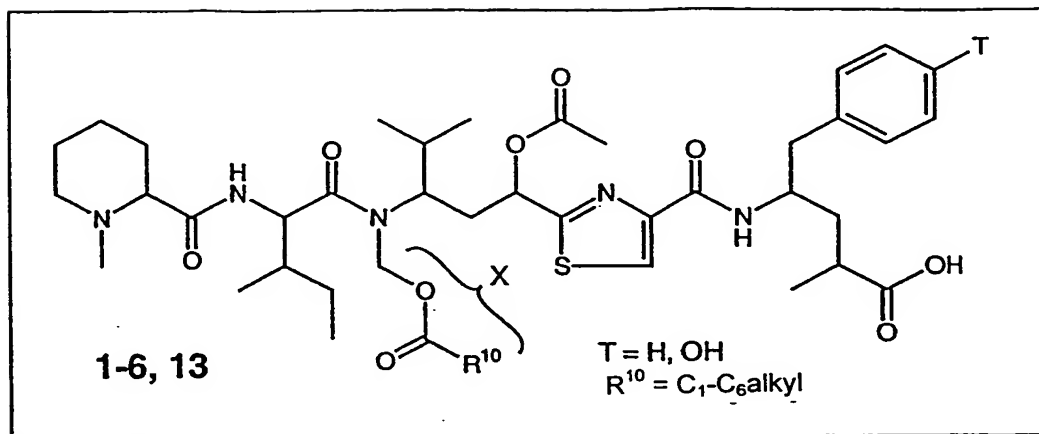


\uparrow
 a)



a) $\text{C}_3\text{Cl}_5\text{NF}$ triflate, SO_2Cl_2 , NBS, ICl; b) NaNO_2 , CH_3COOH , EtOH; c) Pd/C , H_2 , EtOH; d) $(\text{R}^3\text{CO})_2\text{O}$

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a) *m*-CPBA, CH_2Cl_2 ; b) Ac_2O , $75^\circ C$